

CLAIMS

What is claimed is:

1. A method of preparing a blank for superplastic forming, said method comprising the steps of joining at least one insert to a parent body by means of friction stir welding, at least one of the parent body and the at least one insert being made of a material which has superplastic properties.
2. A method as claimed in claim 1 wherein friction stir welding is carried out using a tool which is passed along the joint line between the insert and the parent body.
3. A method as claimed in claim 1 wherein the parent body is provided with a cutout into which the insert fits.
4. A method as claimed in claim 3 wherein said cutout opens into an edge of the parent body so that the insert, when joined to the parent body, forms at least part of the external edge of the blank.
5. A method as claimed in claim 3 wherein said cutout is closed, thus forming a hole passing through the parent body.
6. A method as claimed in claim 1 wherein the insert is placed against the blank and joined thereto so as to form a layered structure.
7. A method as claimed in claim 1 wherein that part or parts of the blank which is made of superplastic material is located so as to correspond to an area of the blank which, during the subsequent forming process, is to be deformed to a greater extent than the remainder of the blank.

8. A method as claimed in claim 7 wherein at least one of the inserts comprises that part of the blank which is made of superplastic material.

9. A method as claimed in claim 1 wherein at least one of the inserts is adapted to perform a mechanical function.

10. A method as claimed in claim 1 wherein at least one of the inserts is preformed to a 3D shape.

11. A method as claimed in claim 1 wherein multiple inserts are joined to the parent body by friction stir welding, and wherein at least one of the inserts and/or the parent body are made of a material which has superplastic properties.

12. A method of superplastic forming comprising preparing a blank by the method as claimed in claim 1, then forming said blank by pressurizing it against a mould.

13. A method as claimed in claim 12 wherein the parent body and the insert are so sized and shaped that the joint between them is positioned in an area of the blank which, during said forming step, is subject to a low stress insufficient to cause distortion of the joint.

14. A blank for use in a superplastic forming process, said blank comprising a parent body and an insert joined thereto by means of friction stir welding, at least one of the parent body and the insert being made of a material which has superplastic properties.

15. A blank as claimed in claim 14 in which, during the superplastic

forming process a limited region or regions of the blank are to be subjected to a greater strain than the remainder, wherein that part of the blank which has said superplastic properties is positioned so as to correspond to a respective limited region or regions.

16. A blank as claimed in claim 14 wherein at least the parent body is of sheet material.

17. A blank as claimed in claim 14 wherein the insert is the same thickness as the parent body.

18. A blank as claimed in claim 14 wherein the insert is of a different thickness to the parent body.

19. A blank as claimed in claim 18 wherein the insert has a thickness which is greater than that of the parent body.

20. A blank as claimed in claim 18 wherein the insert has a thickness which is less than that of the parent body.

21. A blank as claimed in claim 16 wherein one or both surfaces of the insert are contoured.

22. A blank as claimed in claim 18 wherein the thickness of the insert in the region of the joint line with the parent body is the same as that of the parent body.

23. A blank as claimed in claim 14 wherein the insert comprises that part of the blank which has superplastic properties.

24. A blank as claimed in claim 23 in which the material of the parent body also has superplastic properties, but to a lesser extent than those of the insert.

25. A blank as claimed in claim 14 wherein the insert comprises means to carry out a mechanical function.

26. A blank as claimed in claim 14 wherein the insert has a 3D shape which is preformed.

27. A blank as claimed in claim 14 comprising multiple inserts joined to said parent body by friction stir welding.

28. A blank as claimed in claim 27 wherein some of said inserts have a different level of superplasticity than the remainder.